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A. INTRODUCTION

Title 41 CFR Part 102-79 titled "Assignment and Utilization of Space", the General Services Administration (GSA) requires the Department to promote maximum utilization of Federal workspace, consistent with mission requirements, to maximize its value to the government.

The Department of Health and Human Services (DHHS) Policy for Sustainable and High Performance Buildings requires the incorporation of sustainable and high-performance design principles in the planning, acquiring, siting, designing, building, operating and maintaining of all facilities.

This guideline provides guidance to the Architect/Engineer (A/E) in the design of office space for the National Institutes of Health (NIH) that meets these requirements.

A.1 Applicability

The Office Fit-Out Guidelines shall apply to the design and construction of all office space constructed for the NIH, whether owned or leased. These guidelines apply to all office spaces that are not accessed through or connected directly to laboratory spaces. These guidelines set a standard for the planning, programming, designing and construction of office and associated support space for the NIH. They establish the quality of workspace at a level that yields functional, well constructed, sustainable and easily maintained facilities. They are also intended to encourage value-based design without inhibiting creativity or aesthetics.

Research offices, cubicles, or desk areas that are located within laboratories shall comply with the NIH Design Requirement Manuals (DRM) for laboratories available for download from the web at:
http://orf.od.nih.gov/PoliciesAndGuidelines/DesignPolicy

A.2 Variances

Every project is unique with respect to site conditions, unique program needs, and other project parameters. For this reason, these guidelines include a mechanism for requesting variances when specific conditions make full compliance unfeasible or unfavorable to the Government's best interests. Variances should not be requested solely on the basis of cost.

Requests for variance shall be submitted to the ORF, Division of Policy and Program Assessment (DPPA) for review and approval. The Architect/Engineer (A/E) shall submit justification for the alternative design electronically to DPPA through the Project Officer (PO).

B PLANNING CRITERIA

B.1 Space Classification

The GSA divides space into broad categories with subcategories for specialized spaces. Following are office related classifications currently used by GSA for planning purposes.

1. Office	Total Office
2. Joint-use Space	Automatic Data Processing (ADP), auditorium, light industrial, structurally changed, lab, conference/training, food service, cafeteria, snack bar, health unit, fitness center, childcare, computer and LAN rooms,
3. General Storage	

B.2 Space Standards

For Utilization Rate (UR) refer to the average space assigned on a per person basis for planning purposes. The standard UR, approved by the NIH Space Recommendation Board for administrative/office space on and off campus is 14.86 m^2 (160 net assignable square (nasf.) per person and 17.65 m^2 (190 net assignable square feet) per person, respectively. These figures are derived from the GSA standards of 12.54 m^2 (135 square feet) per person for primary office space plus 20 percent additional space for associated support areas.

Included in the standard UR are primary office space, reception area, circulation space, associated storage space and auxiliary space (such as conference rooms, processing area, high density file room, break room, etc.). Excluded from the standard UR are the common areas such as public elevator lobbies, main corridors, restrooms and joint use areas (See Appendix 1). In small or historic buildings, the UR may be increased to address structural limitations of buildings and building inefficiencies. Other factors that may affect the space requirements are space availability, irregular building shape, and budget.

Space requirements based on pay grade for maximum area per person are no longer mandated by federal regulations, stipulated by GSA, or recommended by the Office of Government wide Policy (OGP), Office of Real Property. The OGP recommends that space requirements be based on job title, defining tasks required for a particular job and on the organization needed to accomplish its mission. How space is allotted among different uses is up to the organization, working with their staff, management and designers. Appropriate space shall be identified and labeled to accommodate for the NIH campus wide recycling program. Guidelines for space recommendations are included in the table in Appendix 1. (See Appendix #1 for space recommendations).

B.3 Site Evaluation

Evaluation of the project site shall include consideration of compatibility with NIH Master Plan objectives, unique attributes and design guidelines specific to the building in which the fit-out is sited, adequacy of the candidate site to accommodate the User's program, existing condition of the building infrastructure and interior construction, site access and phasing issues, collateral impacts to other building occupants, security issues, and the possible need for abatement of hazardous materials, and estimated project cost. The Basis of Design shall address each of these issues during the pre-design / schematic phase of the project to ensure that the candidate site is suited for its intended use.

C DESIGN CRITERIA

Design considerations shall include functional requirements, economy of construction, energy conservation, sustainability, maintenance issues, spatial organization, and aesthetics. The design shall fully address User program and organizational objectives while providing visual interest and state-of-the-art features compatible with NIH's mission of research and discovery.

C.1. Sustainable Design:

The interior fit-out design shall contribute to and support the campus wide sustainability goals as well as the Government policies for incorporating sustainability into new construction and building operations and maintenance. All improvements, repairs, and/or maintenance projects at NIH with a construction cost equal to or greater than $1 million, shall incorporate the primary elements of sustainable design to the maximum extent feasible. A minimum Green Globe or LEED certification is required for renovations and new construction equal to or greater than $3 million.

C.2. Cost:

The interior fit-out cost per square footage shall be based on the tenant improvement allowances identified in the latest GSA Pricing Desk Book. As an HHS entity, use the tier 2 per square footage cost data. An annual 3.5% inflation factor shall be added to each year when projecting future costs.

All NIH projects shall comply with applicable regulations, codes, and standards. The most recent edition of the codes and criteria shall be used throughout design and construction. Where specific systems and materials are listed as criteria, they are not intended to prohibit the use of alternative approaches not specifically outlined in the document. Proposed alternative designs shall be equivalent or superior to the requirements of this guideline with regard to quality, durability, sustainability and performance. Alternative design approaches shall be approved via the variance process listed in section A.3.

D ARCHITECTURAL

Design features and materials selected for the construction of offices shall be durable, easy to maintain, and contribute to the creation of a comfortable, productive, flexible and safe work environment. Preference shall be given to materials containing recycled or renewable material and those sourced locally.

D.1. Partitions:

Partitions shall be selected based on projected space use. Demising partitions separating different tenants or functional uses shall be extended to underside of structure above. When flexibility for future change is a primary design factor, it is highly recommended that consideration be given to the use of pre-finished, demountable partitions that are easily reconfigured for subdividing within tenant areas. Limiting internal suite partition heights to the underside of ceilings can also enhances flexibility for future changes. Partition design shall conform to code criteria for fire rating, acoustical rating, flame spread and thermal insulation.

D.1.1 Gypsum Wallboard Partitions: Where metal framing and gypsum board partitions are acceptable for use, they shall meet the requirements of ASTM C754. Application of gypsum wallboard shall meet standard ASTM C840. Selected Gypsum board shall contain between 75%-100% recycled content.

Cold-formed galvanized framing studs, tracks, and furring channels for gypsum board partitions shall be .68 mm thickness (22 gauge, .0269”), 92 mm (3 5/8”) in depth, and spaced at 406 mm (16”) on-center. Other framing components, such as furring channels shall also be a minimum of .84 mm thick. Framing components shall have a recycled content of 50-100%. Gypsum wallboard shall be a minimum of 16 mm (5/8) thick.

Full height partitions shall be constructed with sufficient tolerance to allow for deflection of the building structure. Lateral bracing shall be provided per association criteria. Partitions that extend to the underside of the ceiling shall be securely anchored to a stable ceiling suspension system. Fasten the top track of the stud system to the ceiling suspension components at 600 mm (24”) on-center with #12 self-cutting screws. Bracing locations shall be coordinated with above-ceiling services and structural elements prior to installation.

Provide slab to slab partitions surrounding any main copy/fax/production rooms, janitors service closets, and chemical/paint/fuel storage areas. If slab to slab partition types are not feasible, sealed drywall wall and ceiling design shall be used

D.1.2 Fire Rated Partitions: Fire rated partitions shall extend slab-to-slab, terminating at the underside of the structure above. Fire rated partitions shall be constructed in accordance with recognized Underwriter Laboratory (UL) assemblies. The following fire rated partitions shall be full height to the underside of structure and constructed in accordance with UL assembly requirements:

A. Fire and smoke partitions
B. Duct and pipe shafts
C. Stair and elevator shafts or enclosures.

D.1.3 Reinforcement: Provide internal partition reinforcing for the installation of millwork, shelving and wall mounted equipment that will impose lateral loads on partitions. Reinforcement shall be provided in all areas intended to support shelving or furnishing, as well as sections of partitions that might reasonably be used for future wall-mounted shelving. Mounting dimensions shall be coordinated with furnishing/shelving systems and other wall hung items. Reinforcement shall meet fire rated assembly guidelines if any material other than metal is used. Wood reinforcement shall be fire retardant.

Consideration shall be given to reinforcing partitions that enclose rooms storing high value or security protected equipment or data with cement board, wire mesh, or other method. Security partitions shall be extended to the underside of the structure.

D.1.4 Trim: Gypsum board trim such as corner beads and edge trim shall be constructed of galvanized metal and mechanically fastened. Plastic and vinyl trim may only be used for specialty applications such as curved edges. All non-mudded edges shall be terminated with edge trim.

D.2 Acoustics:

The following table identifies minimum acoustical properties for various office spaces.

Space Usage	Noise Isolation Class (NIC) Rating (dB)	Noise Criteria (NC) Rating (dB)
Demising Partitions	48	N/A
Enclosed Offices	40	35
Director / Branch Chief Offices	45	30
Open Offices	N/A	40
Conference Rooms	48	25
Large Conference Room	53	20

Conference rooms over 15 m^2 (160 sf) in size shall be designed to optimize speech and multi-media functions through reverberation control. Interior finishes shall be selected to create an appropriate reverberation time (RT-60) of between 0.7 and 1.0 second. To achieve this, it is recommended that the rear walls and 50% of the sidewalls be covered with 25 mm (1") thick fabric-wrapped fiberglass acoustical panels. Ceilings shall be rated at NRC-0.80 or higher. Acoustic wall panels shall to have a recycled content of 25-75%.

D.3 Doors:

Doors shall be either solid-core wood or hollow-metal construction. Hollow core wood doors are not allowed. The standard door shall be 900 mm (36") 45 mm (1 3/4") thick, with a minimum height of 2100 mm (7'-0"). Other widths may be used for specific purposes provided that they meet ADA criteria. Glass doors may be used at suite entries provided that they meet security and fire rating requirements. Single leaf entrance doors are preferred.

Door assemblies shall comply with all appropriate codes. Fire rated doors, frames and hardware shall have appropriate labels. All fire doors shall be provided with closers.

Wood doors shall be surfaced with stain grade, matching-edge, hardwood veneer and finished with a transparent sealer. For doors to be painted, "paint grade" veneers are acceptable. Preference shall be given to wood doors with cores composed of agrifiber and/or Certified Wood (as certified by the Forest Stewardship Council) and those that contain no urea formaldehyde.

Vision panels shall be provided in all doors that present a potential striking hazard. Individual office or spaces where privacy may be needed do not require vision panels, but may have obscure glass panels to admit light without permitting vision. Use of vision panels shall be confirmed with users.

Doors to rooms storing high value or security protected equipment or data shall be flush, with no vision panels or sidelights.

Doors to rooms containing copy/fax/production supplies, janitors supplies, or chemical/paint/fuel storage shall be self closing.

D3.1 Door Frames: Door frames shall be 16-gauge steel, with mitered, welded corners, except special applications such as interior pocket doors or hardwood doorframes with classical moldings. Special applications shall be submitted for waiver through the Project Officer (PO). Knock-down steel frames are prohibited unless specifically approved in writing by NIH. Door frames in gypsum wallboard assemblies shall be double studded, and installed in accordance with the Steel Door Institute (SDI) Recommended Erection Instructions for Steel Frames. Hollow metal doors and frames shall have a recycled content of 15-50%.

D.3.2 Door Hardware: Hardware shall be "heavy duty" for all products, (locksets, hinges, closers, etc.). Hardware scheduled for installation on fire rated

doors and frames shall comply with all code requirements governing hardware type and installation methods for rated assemblies. Suite entry doors shall be self-closing.

The Office of Research Facilities Management Support Branch (0RF/DPM/MSB) Locksmith Shop, provides specific information on the keying requirements for all NIH projects. The key system design for all projects that include new or existing doors, shall be submitted to the Locksmith Shop, the Division of Fire Marshal, and the Division of Police for a concurrent review. Contact the aforementioned offices, for additional information on door hardware and keying systems.

Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80. This requirement takes precedence over other requirements for such hardware. Provide only hardware that has been tested and listed by UL for the type and size of door required, and complies with the requirements of the door and the doorframe labels. Latching hardware, door closers, ball bearing hinges, and seals are required whether or not listed in the Hardware schedule.

D.3.3 Security Hardware: Provide electronic access control hardware as required per NIH security level assessment, and in accordance with NIH Physical Security Design Guidelines.

D.4 Millwork:

Custom built-in cabinets, desks, book cases, countertops, etc. should be minimized as they inhibit flexibility in the arrangement and potential use for interior space. Use of manufactured products or furnishings that are easily moved is recommended. Where the use of built-in furniture is necessary, the design and construction shall be modular and easy to relocate.

The design and construction of all built-in furniture shall be fabricated as custom millwork items, per requirements of the Architectural Woodwork Institute (AWI) with premium-grade hardwood veneer panels and solid hardwood, stained and finished with a transparent sealer, unless otherwise directed. All custom millwork shall contain no urea-formaldehyde. Preference shall be given to materials containing agrifiber and/or certified wood (as certified by the Forest Stewardship Council) and containing no-urea formaldehyde.

D.4.1 Cabinet Hardware: Specify only cabinet hardware that complies with ANSI A156.9, "American National Standard for Cabinet Hardware" and, verify compliance in shop submittals and by inspection of installations.

Drawer slides shall be side-mounted type rated for intended use but in no case carrying less than a 45 kg (100 lb.) load rating. File drawer slides shall carry a minimum 68 kg (150 lb.) load rating, and allow for full drawer extension

D.4.2 Plastic Laminates

D.4.2.1 Countertops

Countertops shall be constructed of 25 mm (1") thick plywood with 1.6 mm (1/16") general purpose high pressure decorative laminate surfacing. Where high density particleboard is used as a substrate, countertops shall be 38 mm (1 ½") thick. Drilled or cored openings in the work surfaces shall be fitted with grommets to accommodated cabling and sized to the opening for wire management.

D.4.2.2 Shelving

Plywood core material for shelving shall be a minimum of 19 mm (3/4") thick If high density particleboard is used as the core material, it shall be a minimum of 30 mm (1 ¼") thick. Shelving shall be faced on all sides and edge banded, including concealed edges. Maximum shelving support spacing shall be 914 mm (36").

D.5 Furnishings:

The use of systems furniture is recommended to provide greater flexibility and standardization of the workspace. Furnishing selections shall reflect current technological advances, especially in the area of ergonomics. Preference shall be given to the use of green sustainable furnishing with maximum recycled materials content. All systems furniture and seating introduced into the project space shall meet Option A or Option B, of the following requirements:

Option A: Greenguard Indoor Air Quality Certified (http://www.greenguard.org/)

Option B: Calculated indoor air concentrations that are less than or equal to those established in Table 1 (See Appendix 4), for furniture systems and seating determined by a procedure based on the U.S. Environmental Protection Agency's Environmental Technology Verification (ETV) Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol conducted in an independent air quality testing laboratory.

The selection and placement of systems furniture shall take into consideration the necessity for access to utilities located in adjacent walls, ceilings and floors. Particular care shall be directed to placement of floor-mounted mechanical heating and cooling equipment that requires maintenance access and air circulation. For furniture layout, provide an accessible route with a minimum 914 mm (36") passage width for wheelchair access and emergency egress.

D.5.1 Panel Based Systems: Specify only movable panels that are pre-wired for electrical service and with dual chase raceways. Where movable panels do not abut a wall, provide a dual chase "power pole" for electrical and telecommunications service.

D.5.2 Work Surfaces: The design and selection of work surfaces should consider the following:

- Color and reflectance value of the work surface relative to the tasks being performed and the surrounding finishes.
- Adjustable height or variable height work tops for a portion of work surfaces to comply with the American with Disabilities Act (ADA) and allow adjustment for specific users and/or tasks.
- Depth of work surfaces shall take into consideration functions to be performed. Deeper 762 mm (30") work surfaces may be required for personnel working with large documents or drawings.

D.6 Interior Finishes and Materials:

The interior finish criteria provide a standard that applies to typical NIH projects. These finishes represent a quality level, and are not intended to dictate specific design solutions or treatments. Long term maintenance requirements are to be considered in material selections. If design objectives lead to the selection of alternate systems that increase cost or decrease durability and service life, submit justification for the alternative design electronically to DPPA through the PO.

D.6.1 Carpet: Carpeting shall be the primary floor surfacing for most office and office support areas. Broadloom carpeting shall be typically used; however, there are applications where carpet tile is practical such as heavy use and food service areas. Carpet tile should also be used whenever there is access flooring, a cellular floor, or a ducted floor system, so that maintenance of systems under the floor can be done without destroying the carpet.

- Carpets shall have low Volatile Organic Compound (VOC) content, meeting the requirements of the Carpet and Rug Institute (CRI) Green Label Plus program (www.carpet-rug.com). All carpet cushions shall also meet the requirements of the CRI Green Label program.
- Carpet material shall have a face weight of a minimum of 737087.598 mg. (26 oz.) synthetic (nylon or equal) commercial-grade broadloom carpet.
- Carpet shall be classified for medium to heavy traffic areas. High traffic areas may require heavier carpet with higher quality pile.
- Carpet shall be only direct glue-down installation utilizing non-asbestos containing adhesive.
- The carpet assembly (broadloom carpet or modular tile) shall comply with all flammability requirements outlined in applicable codes.
- When carpet is used in corridors adjacent to building entrances, walk-off mats shall be provided to extend the life of the carpet installation and reduce the tracking in of outdoor contaminants.

- Carpet shall not be provided in personnel break areas and food preparation areas. While the use of carpet is not recommended in food consumption areas, if selected, specify antimicrobial compositions.
- Adhesive shall be water resistant, mildew resistant, non-staining, non-gassing (low VOC content less than 50g/L) type as recommended by the manufacturer for products and subfloor conditions.
- Carpet tiles shall be cut by the die cut method only.
- Carpet shall have a recycled content of 25-100% recycled material.

D.6.2 Resilient Flooring: Resilient flooring shall be used in break areas, pantries and other areas subjected to spills or staining. Where appropriate, use environmentally preferred material such as linoleum or rubber.

A minimum of 3.2 mm (1/8") thick material is required. Where different floor materials adjoin, provide rubber transition strips. When resilient flooring is used in corridors adjacent to building entrances, walk-off mats shall be provided to extend the life of the flooring and reduce the tracking in of outdoor contaminants.

D.6.3 Base: A base strip shall be provided to protect partitions from scuffing by cleaning equipment, and to cover floor finish seams. Base shall be a minimum of 100 mm (4") high, and installed in the maximum continuous lengths possible.

- Resilient flooring shall utilize a 3.2 mm (1/8”) thick coved base; linoleum or rubber.
- Carpeted floors shall utilize a 3.2 mm (1/8”) thick straight base; linoleum, rubber, or a hemmed carpet base made of the same carpeting applied to the floor.
- A wood base, where required, shall be a minimum of 100 mm (4") high by 19 mm (3/4”) thick. It shall be made of hardwood and stained or painted. The wood base shall be comprised of Certified Wood as certified by the Forest Stewardship Council.

D.6.4 Ceilings: Typical ceilings shall be constructed of suspended acoustic tile 600 mm x 600 mm (24" x 24") or 660 mm x 1220 mm (24” x 48”) in a standard 25 mm (15/16”) grid. Tile shall be (19 mm) 3/4" thick, tegular edge panels, minimum of 25-70% recycled material content, minimum noise reduction coefficient NRC 0.60, minimum light reflectance 0.83, 13 mm (9/16") tee suspension system. The preferred ceiling height is 2743 mm (9’) for open office areas, and 2440 mm (8’) for enclosed offices and office support spaces. The minimum ceiling height shall be 2440 mm (8’-0”). Suspended gypsum board ceilings may be used for bulkheads, accent areas, or special use areas requiring fire rating, security protection or containment of contaminants such as: janitorial supplies, reproduction equipment, or hazardous. Concealed spline ceiling systems requiring special tools for tile removal are not acceptable. Other ceiling elements, such as soffits, perimeter coves, recesses and

reveals shall be provided as required to integrate heating, ventilation and air-conditioning (HVAC), lighting and sound system into a harmonious design.

- Acoustical ceiling tile shall have a recycled content of 25-75% and acoustical ceiling suspension system of 50-75%.
- Acoustical products shall have a Class A resistance per ASTM E 1264 and a flame spread of 0-25 per ASTM E 84.
- Life Safety Code, NFPA-101, requires a means of egress to have minimum headroom of 2300 mm (7'-6"). Any projection from the ceiling shall be at least 2030 mm (6'-8") from the floor.
- Coordination with lighting fixtures, access panels, sprinklers, diffusers, and fire alarm devices shall be considered during design.
- The ceiling surface shall not be used for the direct support of other elements, except that sprinkler escutcheons may be friction held from the ceiling surface. Such items shall be secured through the ceiling to secondary support members.
- Heavy equipment and equipment tracks shall be securely suspended from independent structural assemblies attached directly to the structural floor and framing members overhead.

D.6.5 Paint: Low-luster acrylic enamel paint shall be used as the primary interior partition finish throughout office facilities. Paint for general interior applications shall be solvent free, water-based, latex paint and primer. Application shall be a three-coat system including one primer coat and two finish coats unless stipulated otherwise. The final coat shall provide a semi-gloss or eggshell finish, except where more durable finishes are required for functional reasons.

- Doors shall be brushed, not rolled. U.L. labels on fire-rated doors and frames, door hinges, and hardware shall not be painted.
- New metal surfaces shall be conditioned with metal preparations, and then primed. Primed surfaces are to be sanded prior to finish painting.
- Ceilings that require painting shall be finished with a flat sheen.
- The VOC content of all site applied interior paints and coating under this section shall not exceed the following limits in grams/liter(g/L):
  - Flat paint: 50 g/L
  - Non-Flats : 150 g/L
  - anti-corrosive/ anti-rust: 250 g/L
  - Varnishes: 350 g/L
  - Laquers: 550 g/L
  - Floor coatings: 100 g/L

- Sealers: waterproofing: 250 g/L
  sanding: 275 g/L
  other: 200 g/L
- Stains: 250 g/L

D.6.7 Vinyl Wall Coverings: The use of wall coverings is discouraged except in specific applications where enhanced wall protection is required, or for special uses that cannot be achieved with a painted finish. All interior finish materials, greater than .91 mm (1/28") thickness, shall be fire retardant or chemically treated for fire resistance.

D.6.8 Sealants, Adhesives and Compounds: The use of 2-part polysulfide, 2 part polyurethane or silicone-synthetic rubber type sealant is preferred. The designer shall determine which specific sealant types are best suited for each individual design. All sealants, adhesives and compound products used shall be non-toxic, low odor, solvent free, antimicrobial, having no hazardous vapors and contain no carcinogenic materials. All sealants and adhesives shall meet the VOC limits as detailed in Appendix 3 and as required by the South Coast Air Quality Management District (SCAQMD) Rule #1168.

D.6.9 Window Treatment: The window treatment selected shall maintain consistent visual appearance on the exterior of the building. The window treatments shall follow the established building specific integrity guideline. Where no standard or building integrity guideline is in use, provide horizontal mini-blinds. Conference rooms or other areas that require glare control or darkening may also be equipped with commercial grade roller shades. Window treatment shall be coordinated with heating and air conditioning to avoid interference with designed airflows. Full closing window treatments shall be placed on all windows that receive direct sunlight.

D.6.10 Interior Signage and Graphics: Interior signage shall comply with guidelines as defined in the NIH Interior Signage Users Manual and Way Finding Standards. All rooms and suite areas shall be identified with signs specifying room number, use and occupancy.

All signage shall comply with the codes and standards referenced by the Architectural Barriers Act Accessibility Guidelines (ADAAG). Coordinate the signage design with any existing applicable building integrity guideline, the campus Master Plan, and the existing room numbering systems.

Guidance on room numbering shall be obtained from the ORF Division of Facilities Planning (DFP). Room numbering shall be submitted to DFP for approval. Approved room numbering shall be indicated on construction documents so that numbering of building components (e.g., panelboards, mechanical and electrical devices, etc.) are properly identified when constructed.

E. HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Each office area shall be supplied with a minimum ventilation rate required by ASHRAE Standard 62 2004. Equipment loads shall be offset by means of the primary cooling equipment. Higher than normal office equipment load, may require supplemental cooling. Any additional HVAC equipment shall meet or exceed the efficiency requirements of ASHRAE 90.1 2004 by at least 30%. Any additional HVAC equipment shall use no ozone depleting substances consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990.

All HVAC shall meet the current ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy Use and ASHRAE 62.1-2004 Ventilation for Acceptable Indoor Air Quality.

Temperature control shall allow all areas to maintain room temperatures at 70º in the winter and 74 in the summer. Temperature control shall be set back overnight between the hours of 9:00 p.m. to 4:30 a.m.. The overnight temperature control in winter shall be set to 66 degrees F; in summer the temperature shall be set to 78 degrees F. Equipment loads shall be offset by means of the primary cooling equipment. Individual temperature control shall be provided for conference rooms, computer rooms, and other special use areas.

If a full building HVAC system renovation is included in the project scope, install metering and current transformer equipment with the ability to separately measure energy and utility consumption for the whole-building uses of: steam/chilled water/gas/oil/ electricity, plus indoor water risers, and outdoor irrigation water use (if applicable) and coordinate with the NIH energy and metering program manager.

Fiberglass linings are prohibited in HVAC system air stream ductwork.

E.1 Commissioning

Any office fit-out project which adds to, disturbs or interfaces with any base building HVAC systems or components (including VAV boxes and ductwork), electrical systems, lighting systems, building automation, and or temperature control shall incorporate commissioning best management practices tailored to the size and complexity of the fit out project. Any office fit-out project which adds partitions that may affect base building system air distribution/return patterns shall incorporate commissioning best management practices tailored to the size and complexity of the fit out project.

Address the impact and coordination of new work with base building systems. Verify the performance and functionality of the new work meeting the intended project outcome without degrading overall building energy efficiency performance, water efficiency, and indoor air quality. Ensure that there will be no overloads on the HVAC, electrical, or plumbing system capacities.

For small projects, the enforcement of this function shall be the responsibility of the NIH project fit-out Project Officer. Performance responsibility shall be shared by the project designers (for base building system effects) and installers (for functional performance).

For medium and larger projects, establish a designated Commissioning Authority (contractor or NIH staff). Include commissioning requirements in the contract and/or construction documents. Provide a commissioning plan. Provide verification of the installation and performance of systems to be commissioned, and a final commissioning report.

E.2 Computer Rooms

Supplemental environmental conditioning may be required for computer rooms with special temperature and humidity needs, especially when constructed in facilities that do not provide 24-7 environmental conditioning.

E.3 Conference Rooms

Conference rooms shall be provided with a dedicated thermostat and temperature control mounted next to the primary entrance light switch and complying with the "Guidelines for Services and Amenities for NIH Facilities". Large conference rooms shall have the use of an independent HVAC system to handle heating and cooling loads for assembly areas when calculations show that the base building HVAC will not provide the required level of cooling when occupied at maximum capacity. Cooling and ventilation requirements for conference rooms shall be calculated assuming full occupancy.

E.4 Copy Rooms

Dedicated areas housing copy machines shall be connected to an exhaust air system to ensure that heat and odors do not migrate into adjacent areas. The number of air changes shall be determined by the volume of the room and the heat output of the equipment Provide ducted exhaust of not less than 0.5 cfm/square feet out of any high volume production and/or chemical/fuel storage room and connect to code-allowed exhaust ventilator directly out of the building.

F PLUMBING

Plumbing fixtures shall meet the following performance requirements:

- 1.6 lpf water closets in men's rooms,
- dual flush (1.6/1.1 or .8 lpf) water closets in women's rooms, or 1.6 lpf or less
- 0.5 lpf urinals,
- 1.8 lpm shower heads, and
- 0.5 lpm spray lavatory faucet aerators.

Domestic hot water shall be provided from either a local hot water heater, or from a connection to an active recirculating hot water main in facilities having central domestic

hot water heating. Hot water heaters shall be located so that the maximum distance to the furthest point of use does not exceed 10,668 mm (35 feet), to ensure prompt availability of hot water. Individual heater source shall have an energy factor of at least 0.95 and shall be equipped with an external or internal heat trap on all inlets and outlets. Hot water at the source should be set initially for 46.1C (115F).

G. ELECTRICAL

Tenant meters measuring electricity and water usage shall be installed and compliant with building automation system (BAS). All meters shall be connected to and integrated with the central BAS system to monitor and continuously optimize performance.

G.1 Power: Office areas shall be provided with dedicated branch circuits with individual neutrals for personal computers and laser printers. A maximum of four (4) personal computers or two (2) laser printers are allowed per one 20 - ampere circuit. General-purpose receptacles shall be provided in other areas for additional equipment as dictated by the Owner/Institute. Special purpose receptacles shall be installed as dictated by the Owner/Institute for specific equipment needs.

Recommendation to color code receptacles for use with computers, isolated grounding needs and general-purpose areas. All outlets shall be labeled using GFI tags for circuit identification as to the circuit breaker and panelboard designation. Open office furniture/workstations shall be provided with dedicated electrical circuits as recommended by the furniture manufacturer.

Typically, when multiple workstations are wired together, besides dedicated electrical circuits to each grouping (maximum of 6 workstations fed from a single circuit), 100% oversized neutrals in the circuit homerun are required to accommodate the possible harmonics as a result of computers and laser printer usage in workstations.

The designer shall coordinate the correct location of receptacle outlets with the layout and design of furnishings. Each outlet shall be positioned in an accessible location that is unobstructed by furnishing panel systems. This also includes communication outlets.

G.1.1 Break Areas: If break rooms or pantries are incorporated into the design, a minimum of two (2) dedicated branch circuits above the countertop shall be provided to accommodate items such as microwaves, coffee makers, refrigerator (Separate circuit), etc. Ground fault receptacles shall be used within 1 meter (3.3') of a sink.

G.1.2 Office Equipment: Large copiers and other equipment with specific electrical requirements shall be identified by the owner/ institute if different from the normal 20 ampere, 120-volt requirement.

G.1.3 Computer Rooms: Power requirements for computer rooms shall be coordinated in accordance with NIH Center for Information Technology (CIT) design guidelines and user requirements.

G.2 Lighting

Lighting design should take into consideration ambient lighting levels, task lighting, and accent lighting for specialty areas. The ambient lighting design shall provide uniformity to allow flexibility in the arrangement of furnishings, and minimal glare at computer screens. Ambient lighting designs shall incorporate both direct and indirect lighting. The role of lighting in creating an overall impression of a space should be recognized. Fixture selection, layout, and type of controls contribute to the ambiance and aesthetic impact of a space. Lighting levels shall not exceed the requirements of ASHRAE 90.1 2004, with an overall average lighting density of 1.1 Watts / square foot. All fluorescent lamps specified as part of fluorescent lighting fixture assemblies shall be low mercury content lamps. The following table identifies required illumination levels.

Office Lighting Illumination Levels (lux)	
Work Surfaces (including task lighting)	525 – 800
Work Area Ambient Lighting	320 – 540
Hallways/Corridors	325 - 525
Conference/Meeting Rooms (variable control)	320 – 755
High Density Filing Areas	430 - 540
Office Automation & Processing Center	320 – 540

G.2.1 Occupancy Sensors: Occupancy sensors are recommended to reduce energy consumption by switching off fixtures during unoccupied times. Digital timer switches are required to conserve lighting energy consumption in areas where occupancy sensors are not practical, (i.e. mechanical rooms, large electrical and telecommunications areas, etc.). Coordinate all spaces recommended for occupancy sensor control with the owner.

G.2.2 User Adjustability: Users shall be able to adapt lighting levels to their activity needs and personal vision requirements. Features shall include:

- Individual light switches for separate rooms
- Zoned lighting for open office areas
- Adjustable window blinds

- Task lighting incorporated into furniture systems at each individual workstation

G.2.3 Spectral Distribution: Design should consider the overall spectral distribution of light within the building, as it impacts overall ambiance of individual spaces (aesthetic effects), task-related visual conditions and color rendition/differentiation (visual ergonomics), and general color rendition of room finishes (physiological/ psychological effects). Spectral distribution of natural light will be impacted by window treatment and orientation.

G.2.4 Computer and LAN Equipment Rooms: Lighting requirements for computer rooms shall conform to applicable NIH policies.

G.2.5 Conference Rooms: Conference rooms shall be equipped with dimmable or bank lighting that allows a portion of the room to be darkened for projection. Large conference rooms shall be equipped with a programmable electronic lighting control system that allows for dimming and zoned lighting during presentations.

G.3 Special Systems

G.3.1 Security Systems: CCTV, intrusion detection, and electronic access control systems shall be provided as required by the NIH security assessment and user requirements. Design of such systems shall comply with the NIH Security Design Requirement Manual.

G.3.2 Audiovisual Systems:

H. COMMUNICATIONS

Infrastructure for user-provided telecommunication and data system wiring and equipment shall be provided as specified in the NIH Center for Information Technology (CIT) Design Guidelines included in their website: http://www.cit.nih.gov The number of electrical circuits and the location of receptacles in a Local Area Network (LAN)/Telephone closet shall be dictated by NIH communication personnel. Provide cable tray or wire management systems for installation of communication and data wiring.

I. MANAGEMENT CONTROLS

1. **Office Responsible for Review**: Division of Policy and Program Assessment (DPPA).
2. **Frequency of Review:** Whenever there are substantive changes or every three (3) years, whichever is earlier.

J. APPENDICES

1. Recommended Area Requirements

2. Abbreviations

3. VOC Limits

4. System Furniture and Seating Indoor Air Concentrations

APPENDIX 1

The following chart is a recommended allotment of space at the NIH.

RECOMMENDED AREA REQUIREMENTS		
Description	**Space Allowance (NASF)**	**Notes**
Executive Offices	225 - 350*	average size allowance
Director	250 - 350	Allows for desk, credenza, visitor chairs, meeting area
Deputy Director	150 - 250	Allows for desk, credenza, visitor chairs, meeting area
Executive Office	100 - 150	Desk, lateral file, 2 visitor chairs
Small to Mid-sized Offices	75 - 175	average size allowance
Employee Office	100 - 125	Desk, file, visitor chair
Administrative Staff	100 per person	Desk, files
Partitioned Open Space	80 - 100	For clerical supervisor or manager
Workstation Area	50 - 100	For clerical, depending on file and equipment needs
	80 - 100	For clerical pool areas
	64 - 80	For technical personnel
Open Plan Office	65 per person	vs. 120 square feet (for enclosed offices).
Access and Circulation Space	20 - 30% of total usable area for corridors and circulation	Allow 25 % if the total office area is less than 50% open space Allow 30% if the total office space is 50%or more open office space. Add 20 % of total for internal circulation space (or 30% of total for conventional furniture and 60% of total for systems furniture).
Conference and Meeting Rooms	25 - 35 per person	Conference seating
	15 per person	Theater style (row type seating)
Classrooms & Training Rooms	10 per person.	Desk/arm chair
	40 per person	Desk and chair
	150 sf (+ 10 sf per person)	For larger meeting rooms
	150	(8 people)
	375	(up to 14 people)
	500	(up to 24)

Reception Areas	150 - 250	Receptionist and 2 - 4 visitors
	250 - 350	Receptionist and 6 - 8 visitors
Break Room	15 per person	Not including kitchen; kitchen to be 1/3 to 1/2 of seating area
Copier Room	150	Can accommodate copier, mail center and office supplies for up to 30 staff
Recycling area (paper, cardboard, plastic/ metal bottles/ cans).	ƒ 140 square feet for a 15 ksf to 40 ksf floor plan. ƒ 200 square feet for a 50 ksf to 100 ksf floor plan. ƒ 250 square feet for a 100 ksf to 200 ksf floor plan. ƒ 400 square feet for a 200 ksf and up floor plan.	

***** Per July 14, 2003 HHS memorandum, offices of over 250 sf per person are reserved for agency heads or equivalents, or department level officials (Deputy Assistant Secretary or higher).

***** No office shall exceed 350 sq. ft.

APPENDIX 2

ABBREVIATIONS

ACT	acoustical ceiling tile
ADAAG	American with Disabilities Act Accessibility Guidelines
A/E	architect and engineer
AF	acoustic fabric
AFF	above finished floor
AIA	American Institute of Architects
ANSI	American National Standards Institute
CPT	carpet
CT	ceramic tile
DPPA	Division of Policy and Program Assessment
FTE	Full-Time Employee
GFI	ground fault interrupter
GSA	General Services Administration
HHS	Department of Health and Human Services
HM	hollow metal
HVAC	heating, ventilation and air conditioning
IBC	International Building Code
LAN	Local area Network
NC	noise criteria
NEC	National Electrical Code
NIH	National Institutes of Health
NRC	noise reduction coefficient
ORF	Office of Research Facilities
OSHA	Occupational Safety and Health Administration
RC	room criteria
SC	solid core
SF	square foot
SDI	Steel Door Institute
STC	sound transmission class
UFAS	Uniform Federal Accessibility Standards
UPS	uninterruptible power supply
VCT	vinyl composition tile

APPENDIX 3

Architectural Applications[1]	VOC Limit (g/l less water)[1]	Specialty Applications[1]	VOC Limit (g/l less water)[1]
Indoor Carpet Adhesives	50	PVC Welding	510
Carpet Pad Adhesives	50	CPVC Welding	490
Wood Flooring Adhesives	100	ABS Welding	325
Rubber Floor Adhesives	60	Plastic Cement Welding	250
Sub floor Adhesives	50	Adhesive Primer for Plastic	550
Ceramic Tile Adhesives	65	Contact Adhesive	80
VCT&Asphalt Adhesives	50	Special Purpose Contact Adhesive	250
Drywall & Panel Adhesives	50	Structural Wood Member Adhesive	140
Cove Base Adhesives	50	Sheet Applied Runner Lining Operations	850
Multi-purpose Construction Adhesives	70	Top & Trim Adhesive	250
Structural Glazing Adhesives	100		
Substrate Specific Applications[1]	VOC Limit (g/l less water)[1]	Sealants[1]	VOC Limit (g/l less water)[1]
Metal to Metal	30	Architectural	250
Plastic Foams	50	Non-membrane Roof	300
Porous Material (except wood)	50	Roadway	250
Wood	30	Single-ply Roof Membrane	450
Fiberglass	80	Other	420
Sealant Primers[2]	VOC Limit (g/l less water)[1]	Aerosol Adhesives[2]	VOC Limit (g/l less water)[2]
Architectural Non-Porous	250	General Purpose Mist Spray	65% VOCs by weight
Architectural Porous	775	General Purpose Web Spray	55% VOCs by weight
Other	750	Special purpose aerosol adhesive (all types)	70% VOCs by weight

Note: Limits are according to

1: South Coast Air Quality Management District (SCAQMD) Rule #1168 (June 2005)

2: Green Seal Standard for all Commercial Adhesives GS-36 (Oct 2000)

APPENDIX 4

Table 1. Indoor Air Concentrations

Chemical Contaminant	Emission Limits Systems Furniture	Emission Limits Seating
TVOC	0.5 mg/m3	0.25 mg/m3
Formaldehyde	50 parts per billion	25 parts per billion
Total Aldehydes	100 parts per billion	50 parts per billion
4 – Phenylcyclohexene (4-PCH)	0.0065 mg/m3	0.00325 mg/m3

Table 1 for furniture systems and seating , U.S. Environmental Protection Agency's Environmental Technology Verification (ETV) Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol conducted in an independent air quality testing laboratory.